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Door locks

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Abstract

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A lock including engaging means and engageable means and locking means to restrain disengagement between the engageable and engageable means said locking means including a key operable cylinder and a hand operable member said lock being lockable in a first locked configuration from which it cannot be unlocked by operation of the hand operable member and a second locked configuration from which it can be unlocked by the hand operable member

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Title

Door Lock.

Summary of the Invention

- 15 According to one aspect of the present invention there is provided a lock including engaging means and engageable means and locking means to restrain disengagement between the engageable and engageable means said locking means including a key operable cylinder and a hand operable member said lock being lockable in a
- 20 first locked configuration from which it cannot be unlocked by operation of the hand operable member and a second locked configuration from which it can be unlocked by the hand operable member

- 25 According to the invention there is further provided lock comprising a central lock connected to rods connectable or connected to remote locks wherein the rods are articulated to facilitate bending during fitting

30 Drawings

Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings
Figure 1 to 13

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Description of the Preferred Embodiments

A lock for a moveable wing and in particular a lock for a sliding security door or sliding patio glass door constructed from aluminium extrusions and having a vertical hollow extrusion on the lock edge of the door

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The lock, in summary when fitted to a door, typically comprising operable handle assemblies mounted on the interior and exterior face of the door, a lock body mounted between the handle assemblies and a catch plate mounted to an element comprising part of the door opening, the lock body being engageable with the catch plate to retain the door in a closed position.

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(The element comprising part of the opening being, for example, a vertical door jamb member or part of an aluminium frame surrounding the opening. Importantly, the catch plate and lock body engage when the door is closed to retain the door in a closed position adjacent the element and therefor in relation to the element)

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Preferably, the catch plate has a hookable (engageable) member 1 which protrudes from a backing plate 2 to be engageable by a hooking (engaging) member 3 of the lock body.

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As the door is brought to the closed position the hookable member passes into a recess 4 within the face 5 (front edge) of the lock body 6 to be engaged by the hooking member- under the action of spring 7 (to by definition, latchingly engage). The operating levers in either handle set may be operated to release the lock body from the catch plate.

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The lock includes locking means including a cylinder 8 by which to restrain disengagement between the hookable member and hooking member.

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The lock in an embodiment, provides means for operating an upper rod 9 and a lower rod 10 to operate engaging means located in an upper remote locking means and engaging means located in a lower remote locking means respectively.

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The lock, as stated above, (described as fitted to a door), preferably comprises handle assemblies, (not shown), which attach to the interior and exterior of the door and which include an angularly displaceable hand operating lever, (or knob), and a lock body which is situated between the levers and preferably within the vertical, closing edge of the door within the frame of the door. The cylinder is preferably a double cylinder 11 accessible and operable from both sides of the door by key but it may comprise other means as described below. The operating levers are operably connected to a cylindrical boss 12 supported within the lock body and preferably by a shaft, (not shown), of rectangular cross section which interconnects the levers while mating within an aperture 13 in the boss in the cam to provide the operable connection..

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Referring to the Fig 1,2 we see that the lock comprises a lock casing 14 of box-like construction having a back wall 15, a front wall or face 5, a first

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side wall 16 and a second side wall comprising a lid (not shown) and upper and lower ends 17 and 18 respectively which may be apertured by an upper aperture 19 and a lower aperture 20 to permit passage of an upper drive slide and a lower drive slide connected to rods connected to an upper and lower remote lock or to permit passage of the rods themselves.

In an embodiment of the lock described in Figures 1 and 2 we can see that the lock comprises the casing which supports and within the casing an operable hooking member 3 having a hooked end portion 21 which is urged by a spring 7 towards a position shown in Fig 2 in which it is engaged with an hookable portion 1 of a strike plate or catch plate. The hooking member is attached to the boss which is supported for pivotal movement having cylindrical ends which locate in circular apertures in side walls of the casing of the lock body. The boss preferably has an axial rectangular aperture 13 which accepts and meshes with a rectangular shaft connected to the operable levers within the handle assemblies such that the levers may be operated to causes the hooking member to downwardly displace to disengage the hookable member. Within the vicinity of the boss is an armed extension 22 of a first rocker member 23 and when the lock is locked as will be described below, the armed extension locates behind an arm 24 of the boss to restrict anti-clockwise movement of the hooking member (in a disengaging direction) to, in practice, prevent disengagement between the hooking and hookable members.

This part of the lock provides latching engagement because when the lock is moved towards the catch plate the ramp 25 of the catch plate and the moveable ramp 26 of the hooking arm latchingly engage whereby the moveable ramp is urged and moved away from the ramp against spring biasing so that when the ramps are no longer in contact, the hooking member is driven upwards by the spring so that the hooked end portion of the hooking member engages behind the hooked portion 27 of the hookable member to provide longitudinal engagement (that is engagement preventing the hooking member (and lock body), from being moved horizontally in a direction parallel the face of the door and, for a sliding door, in an opening direction.

Also within the casing is a locking-slide member 28 which is supported to be able to slide vertically and this has rearwardly a cam-recess 29 in which the cam 30 of the cylinder can locate to actuate the slide. The locking-slide is operable from an upwardly disposed (undisplaced, unlocked), position shown in Fig. 1 to a downwardly disposed (displaced, locked), position shown in Fig. 2 and in which the cam has partially left the cam-recess so that as to prevent the locking-slide from being made to slide by other means. The upper end of the locking-slide has a forward offset portion 31 and adjacent this is the first rocker member 23 which is supported, somewhat centrally within the casing by a pin joint 32 comprising a pinned protrusion 33 of the casing side wall in a cylindrical recess in the first rocker. The first rocker member on the end disposed towards the front edge has a rear forked recess 34 which may straddle a cross-pin 35 in the end of the upper rod while on the

otherside of the pivot axis there is **forward forked recess 36** which locates around a **pinned protrusion 39** of the locking-slide forward offset.

5 Similarly there is located beneath the cylinder, a **second rocker member 40** pivotally supported by a **pinned protrusion 41** which has somewhat centrally an **elongated recess 42** within which locates a **pinned protrusion 43** of the locking-slide and at the free end (remote from the axis of rotation) on the end of the second rocker, is a **forked recess 44** which may straddle a **cross-pin 45** in the end of the lower rod.

10 From lever mechanics that a movement of 1 unit of the locking-slide causes movement of greater than 1 of the pins **35** and **45** which themselves are counteracting and move simultaneously in opposite directions.

15 In the embodiment including rods the lock is configured so that the rods are fully retracted when the cylinder cam **16** is in the upward (undisplaced) position as shown in Fig 1 and they are fully extended when the cam is in the position shown in Fig 2 and this second configuration corresponds with locking of the lock and it would correspond with the locking of each remote engaging means.

20 In another embodiment, Fig 3 and 4 a **drive-slide 46** protrudes the top and bottom of the casing to be connectable to an upper and lower rod which in this embodiment all three displace simultaneously in the same direction. In this embodiment there is provided a **casing 47** which supports and preferably within the casing an operable **hooking member 48** which is urged by a **spring 49** towards a position shown in Fig 4 in which it engages a **hookable portion 50** of a **catch plate 51**. The hooking member is supported for pivotal movement by an annular boss which locates in circular apertures in the side walls of the casing. The boss has an axial aperture which accepts and meshes with a rectangular shaft connected to operable levers within the handle assemblies such that the lever may operated to cause the hooking member to disengage the hookable member. Within the vicinity of the hooking member is an **locking-portion 52** of the drive-slide member and when the lock is locked the locking portion locates behind an **armed extension 53** of the hooking member to restrict clockwise movement to, in practice, prevent disengagement of hooking member and the hookable member. The lock provides latching engagement because the hooking member and hookable member engage under the action of a spring as the door is closed.

40 The drive-slide is supported to be able to slide vertically and this has rearwardly a **recess 54** in which the cam **55** of a cylinder locates. The drive-slide is operable from an upwardly disposed (undisplaced, unlocked) position shown in Fig. 3 to a downwardly disposed (locked) position shown in Fig. 4 and in which the cam has partially left the recess so that as to prevent the slide from being made to slide by other means. The upper end of the slide has a **rearward offset portion 56** and the lower end has a **rearward offset portion 57** each of which protrude from the end of the casing to be connectable to remotes locks.

Also supported within the casing adjacent the drive-slide is the locking-slide discussed above in another embodiment. This locking-slide connects to a **rocker member 58** which is supported within the casing by a **pin joint 59** comprising a pinned protrusion of the casing towards the front edge of the casing in a cylindrical recess in the rocker. The rocker member rearwardly has a **forked recess 60** within which a **cylindrical protrusion 61** of the drive-slide locates while within the length of the rocker (somewhat centrally there is a **longitudinal recess 62** within which a **pin protrusion 63** of the locking-slide locates. It can be seen on the basis of lever mechanics that a movement of 1 unit of the locking-slide causes movement of greater than 1 of the drive slide.

In a preferred embodiment there is an operable **gate 64** which prevents the lock from being locked (the locking slide from being moved to lock the lock) until the lock has engaged the catch plate. Preferably the gate comprises an **arm 65** supported forward of the locking slide on a **pin 66** from the side of the casing and which is biased by **spring 67** to engage in a **recess 68** in the front edge of the locking-slide so as to restrain the slide from moving downwards. The arm has an **armed extension 69** on the other side of its **pivotal axis** which is engageable by a **pinned protrusion 70** from the catch plate which has passage through an **aperture 71** in the face of the casing. The lock is configured such that when the casing is close enough to the catch plate for the hooking member to engage the hookable member, the pinned protrusion pushes the armed extension sufficiently to cause the arm to leave the recess and no longer restrain movement of the locking-slide.

Preferably there is also a hand operable locking/unlocking -lever, (often and also referred to herein as a **Snib**), (not shown) supported within the interior handle assembly which can be angularly displaced by hand to lock and unlock the lock, to and from a **second locked configuration** as shown in Fig 6, (in which the locking slide has been displaced downwardly to lock the lock but where the cylinder cam is still within the cam recess), in a similar manner to the cylinder.

The **Snib** is operably coupled to the locking-slide and preferably the snib comprises a lever connected by a **snib-shaft** of rectangular cross-section to an angularly displaceable **snib-boss 72** supported in circular apertures in the sides of the casing and having an **axial aperture 73** of similar cross-section enabling mating between the boss and shaft. The snib-boss has a **snib arm 74**, an armed extension having a sideways protruding **pin 75** which locates in a substantially horizontal slot **76** in the locking-slide whereby rotation of the snib causes rotation of the snib-boss to cause the locking-slide to move.

It should be noted that the lock has two locked configurations. A "second locked configuration" to and from which the lock may be moved by the **Snib** and a "first locked configuration" to and from which the lock may be moved by operation of the cylinder only. Importantly a lock locked to the "first locked configuration" by the cylinder cannot be unlocked by the snib but a lock locked

by the snib or cylinder to a "second locked configuration" can be unlocked by the cylinder or snib.

5 As stated above, the locking-slide comprises a blade like plate with the slot engaged by a pin 75 on the pivotally snib-arm 74, and a concave recess 29 engagedable with the pivotally supported cam comprising part of the key operable cylinder, said recess having an upper drive shoulder 76 and a lower drive shoulder 77 respectively. Within a first range of movement (between undisplaced and the first locked configuration) the cam and the locking-slide are coupled whereby translational movement of the locking-slide causes the cam to angularly displace while angular displacement of the cam causes the locking-slide to displace. Within this first range of movement the locking-slide may be actuated by either the snib via snib-arm or the cylinder via cam.

10 15 At the limit of this first range of movement and corresponding to the locking-slide being in the second locked position (where the hooking member is restrained from movement) the cylinder cam may be displaced (when a detent has been rendered inoperative) in a second range of movement wherein the locking slide remains substantially unmoved and where coupling between the cam and locking-slide ceases so that the locking-slide can no longer displace the cam and in effect displacement of the cam into the first range of movement secures the locking slide in the first locked configuration.

20 25 When the locking-slide has been moved to the first locked configuration, a surface on the exit shoulder of recess, portion 78, lies substantially orthogonal to the pivotal axis 79 of the cam. At this point the leading edge 80 of cam can be moved to slide on the portion 78 without substantially moving the deadlocking slide.

30 35 In a preferred embodiment the cylinder is prevented from locking to the first configuration unless a detent 80 is rendered inoperative. In a preferred embodiment this comprises a depressable hand operable enabling button 81 preferably located within the front edge of the lock which on depression enables the cylinder to be operated to lock the lock to the "first configuration" and a control-slide 82 which controls the cylinder cam.

40 45 Adjacent the locking-slide is a control-slide 82 by which the cam is controlled and which forms part of the detent discussed above. The detent restricts the movement of the cam so as to restrict it from leaving the snib-recess as occurs in the first locked configuration. The locking-slide may be moved from unlocked (and undisplaced) to locked in the second configuration where the locking-slide is downwardly displaced but not quite fully downwardly displaced by the snib or cylinder and moved back to the undisplaced position by either.

50 The control-slide comprises a blade like plate with a concave recess 83 engagedable with the pivotally supported cam comprising part of the key operable cylinder, said recess having an upper drive shoulder 84 and a lower drive shoulder 85 respectively. Within a first range of movement (between undisplaced and the first locked configuration) the cam and the

control-slide are coupled whereby translational movement of the control-slide causes the cam to angularly displace while angular displacement of the cam causes the control-slide to displace.

- 5 At the limit of this first range of movement and corresponding to the locking-slide and control-slide being in the second locked position (where the hooking member is restrained from movement) the cylinder cam may be displaced (when the detent has been rendered inoperative) in a second range of movement wherein the locking-slide and control-slide remains substantially
10 unmoved and where coupling between the cam and control-slide ceases.

The detent is used to prevent the control-slide from moving to a position where the cam can be moved out of the recess and hence out of the cam recess in the locking-slide thereby preventing the lock from being locked to
15 the second configuration. The detent preferably comprises the enabling button which has a ramped face 86 on an inward extension 87 which is adjacent a ramped face 88 of the leading end portion of a displaceable cross-slide 89 which is able to slide horizontally between an upper fin 90 and a lower fin 91 (being finned extension from the inside wall of the casing) and said cross-slide
20 having an upwardly disposed shoulder 92 wherein when the cross-slide has been pushed in sufficiently far it is able to rotate clockwise by dint of the shoulder having been urged from between the fins and no longer impeding the cross-slide from angularly displacing. At this point the ramped face of the inward extension urges the cross-slide upwards so that the shoulder engages
25 behind the upper fin of the casing to hold the cross-slide retracted and slightly clockwise disposed. In this position the cross-slide leading end portion does not impede movement of the control-slide nor cam and the lock can be locked to the first locked configuration.

- 30 Prior to this cross-slide being depressed to the retracted "enabling configuration", the control slide can only be displaced downwardly to the position where the first shoulder 93 of the locking-slide engages the leading end portion 94 and then further control-slide movement is prevented (corresponding to Figure 6 showing the lock in the second locked
35 configuration), but if the cross-slide has been depressed the cross-slide is outside the loci of movement of first shoulder and the control-slide can be displaced downwardly till the second shoulder 95 of the control-slide strikes the leading end of the cross-slide as shown in Fig 7 and disengages its shoulder from behind the fin as shown Fig 7 and so that when the control-
40 slide is subsequently moved upwardly it allows it to move outwardly to the undisplaced position while displacing the enabling button to the undisplaced position.

45 This unrestrained downward position of the control-slide enables the cam to rotate to the position corresponding to the first locked configuration.

This locking means is applicable to many types of locks including locks having sliding latch bolts which are spring biased towards their extended protruding position such as that described in the Australian patent 16404/97 and
50 77719/94 and locks for sliding doors having spring biased hooked arms

which engage a hooked catch plate as the door is closed and any lock which includes both a cylinder and a snib.

5 Preferably the lock is operated by both a double cylinder 11 and an interior snib, (being a hand operable member), as described in the embodiments above but the invention also anticipates a lock configured as follows and operable as described below:

- A double cylinder only, key operable from both sides each locking and unlocking from the first configuration
- 10 • A cylinder being key operable exteriorly and knob operable interiorly, each locking and unlocking from the first configuration
- A cylinder key operable on the exterior and being a dummy cylinder interiorly and a hand operable snib lever/knob interiorly, the cylinder locking and unlocking from the first configuration A snib lever interiorly
- 15 • only, locking and unlocking from the second configuration
- A single operable cylinder exteriorly locking and unlocking from the first configuration
- A single cylinder interiorly locking and unlocking from the first configuration
- 20 • A lock as described in the adaptations immediately above but including a detent and an enabling button
- and other such configurations

25 The above described configurations would have handle sets to suit, i.e. the inclusion or omission of knobs and or levers and the omission or plugging of associated mounting recesses and the provision of double cylinders having a key operable barrel on each end or cylinders having a key operable barrel on one end and a solid dummy end on the other or a operable knob as the case may be. The inclusion of a snib does not necessitate the inclusion of a cylinder and the inclusion of a cylinder does not necessitate the inclusion of a snib lever or knob. Preferably the cylinder, for ease of operation of the key is located as far towards the rear of the casing as is practicable and preferably the rear casing wall portion is omitted behind the cylinder.

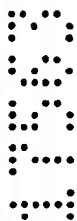
35 As mentioned above, rods may be employed to connect to remote locking means. To overcome some of the fitting difficulties often encountered each of the rods may be articulated as shown in Fig 10 where towards the lock end there is a pivotal joint 96 comprised of flattened end of the joining rods 97 through which passes a rivet 98 and between the rivet head and the flattened ends a compression spring 99 which urges the flattened ends together. Within the flat face of one of the flattened ends is a concave recess 100 while on the other a convex ridge 101 such that the ridge and recess are adjacent and mating when the articulated rod assembly is straight, the spring together with the recess and ridge combining to provide a moment to resist any attempt at bending by the articulated assembly. During assembly of the lock into a door the joint can be forced to angularly displace while the

40 substantially longitudinal forces applied during lock operation are not sufficient to buckle the rod, i.e. the spring is selected to be sufficiently strong and the other dimensions defining the joint are selected to achieve this.

45 Throughout this specification and claims which follow, unless the context requires otherwise, the word "comprise" and variations such as "comprises"

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- or "comprising", will be understood to imply the inclusion of a stated integer or group of integers or steps but not the exclusion of any other integer or group of integers and the positional prepositions such as up, down, rear which are used to assist in description of the preferred embodiments have in general no absolute significance.
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John Russell Watts

18/2/2000

THE CLAIMS DEFINING THE INVENTION ARE:

- 1 A lock including engaging means and engageable means and locking means to restrain disengagement between the engageable and engageable means said locking means including a key operable cylinder and a hand operable member said lock being lockable in a first locked configuration from which it cannot be unlocked by operation of the hand operable member and a second locked configuration from which it can be unlocked by the hand operable member
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- 10 2 A lock according to claim 1 wherein the locking means includes detent means to restrain the lock from adopting the first locked configuration
- 3 A lock according to claims 1 or 2 where in the detent means includes an enabling push button by which the detent is rendered inoperative.
- 15 4 A lock according to any one of the above wherein the locking means includes a locking slide moveable in a first range of movement by operation of the cylinder and by operation of the hand operable member wherein the cylinder cam and locking slide are operably coupled.
- 20 5 A lock according to claim 4 when dependent on claim 2 wherein when the detent is rendered inoperative the cylinder cam may be rotated to and within a second range of movement in which the locking slide remains substantially unmoved said second range corresponding to the first locked configuration.
- 25 6 A lock according to claim 5 wherein the detent means includes a control slide
- 7 A lock according to claim 6 wherein the detent includes a cross slide spring biased towards a position restricting movement of the control slide and consequently the cylinder cam and operable to a position where the control slide and cylinder cam are not so restrained
- 30 8 A lock according to any one of the above claims wherein the engaging means comprises a hooked member

- 9 A lock according to any one of the above claims wherein the lock comprises a hooked member
- 10 A lock according to any one of the above claims wherein the engaging member and engageable engage each other under the action of a spring as they relatively approach to thereby engage in a latching manner
- 5 11 A lock according to any one of the above claims including counteracting means operable by movement of the locking slide and by which remote locks may be operated
- 10 12 A lock according to claim 9 including points of attachment for rods connected to remote locks these points of attachment moving simultaneously with the locking slide but relatively proportionally more.
- 13 A lock according to any one of the above claims including co-acting means operable by movement of the locking slide and by which remote locks may be operated
- 15 14 A lock according to claim 11 including points of attachment for rods connected to remote locks these points of attachment moving simultaneously with the locking slide but relatively proportionally more.
- 15 A lock according to any one of the above claims wherein the locking means includes at least one slide of slide means and the engaging means comprises a hooked member wherein in the first and second locked configuration the hooked member is restrained from movement by the slide of the slide means
- 20 16 A lock according to any one of the above claims including means for restraining operation of the locking means unless the engageable means and engaging means are in a predetermined position
- 25 17 A lock according to claim 14 where the said means includes a pinned protrusion associated with the engageable means
- 18 A lock according to any one of the above claims where in there is an alignment pin associated with the engageable means
- 30 19 A lock according to any one of the above claims when dependent on

claims 10 or claim 12 wherein the rods connectable or connected to remote locks are articulated

- 20 20 A lock according to claim 17 wherein the articulated rod comprises two rod portions joined at end portions each flattened one having a
- 5 concave recess the other a fin like convex ridge which when the assembly is substantially co-linear nests within the recess. The joint further comprises a through fastener having a head and a compression spring located between the head and end options to urge them relatively together.
- 10 21 A lock comprising a central lock connected to rods connectable or connected to remote locks wherein the rods are articulated to facilitate bending during fitting
- 22 A lock according to claim 19 wherein the articulated rod comprises two rod portions joined at end portions each flattened one having a
- 15 concave recess the other a fin like convex ridge which when the assembly is substantially co-linear nests within the recess. The joint further comprises a through fastener having a head and a compression spring located between the head and end options to urge them relatively together.
- 20 23 A lock substantially as described herein with reference to and as illustrated in the accompanying drawings.

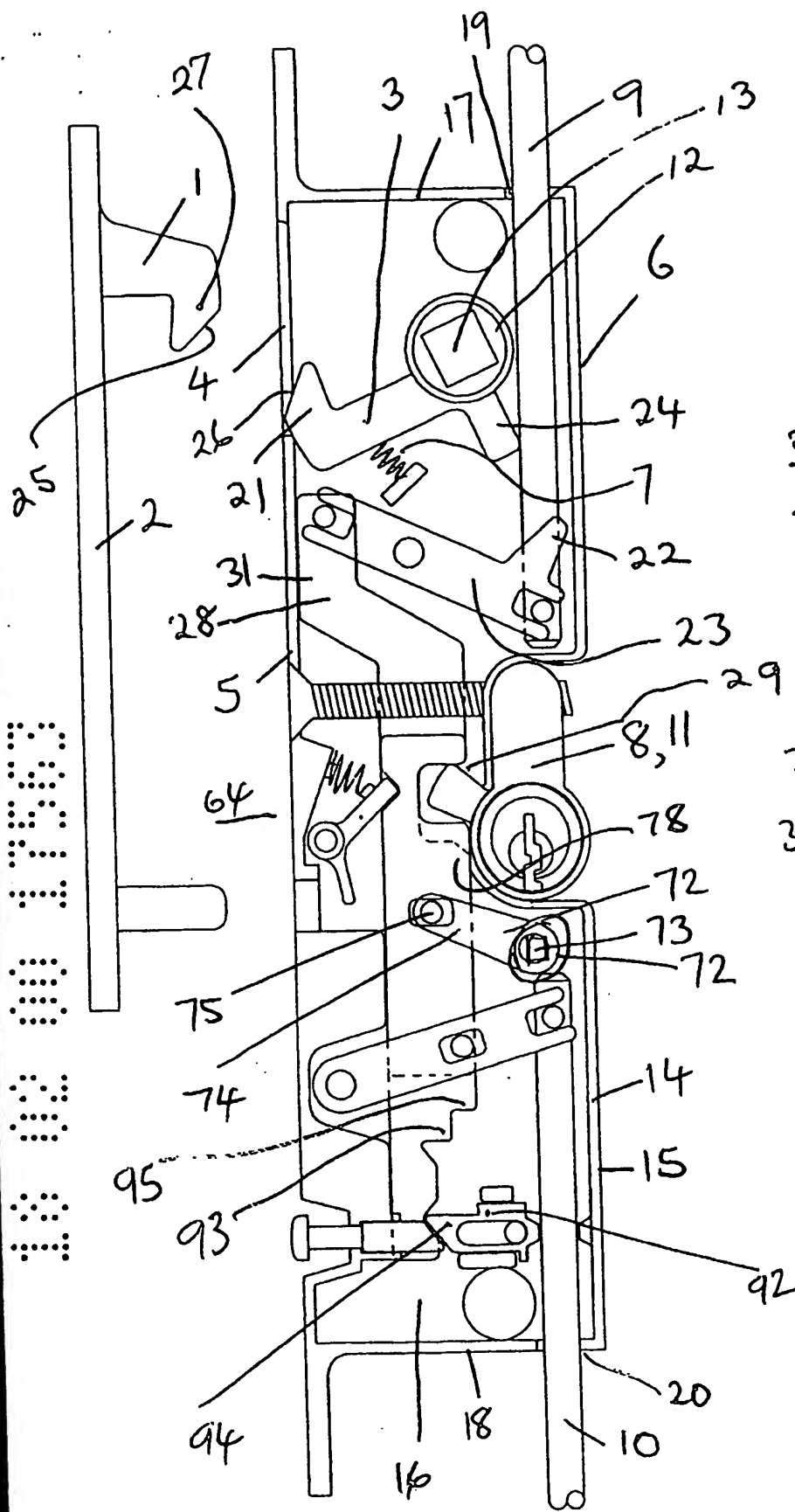


FIG 1

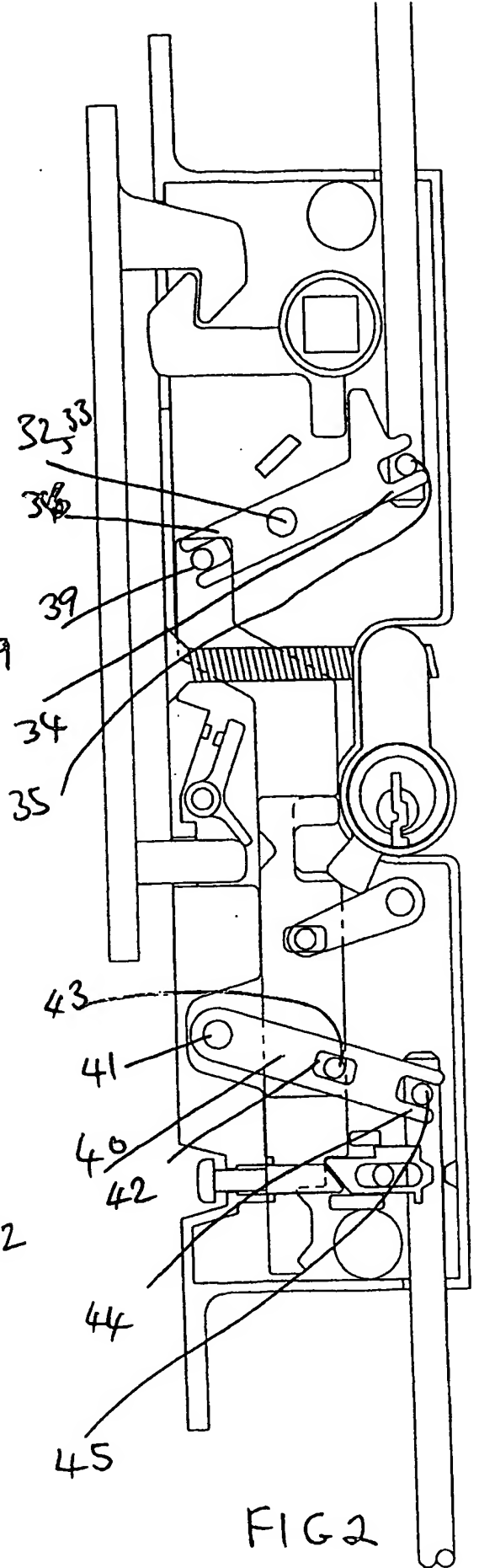
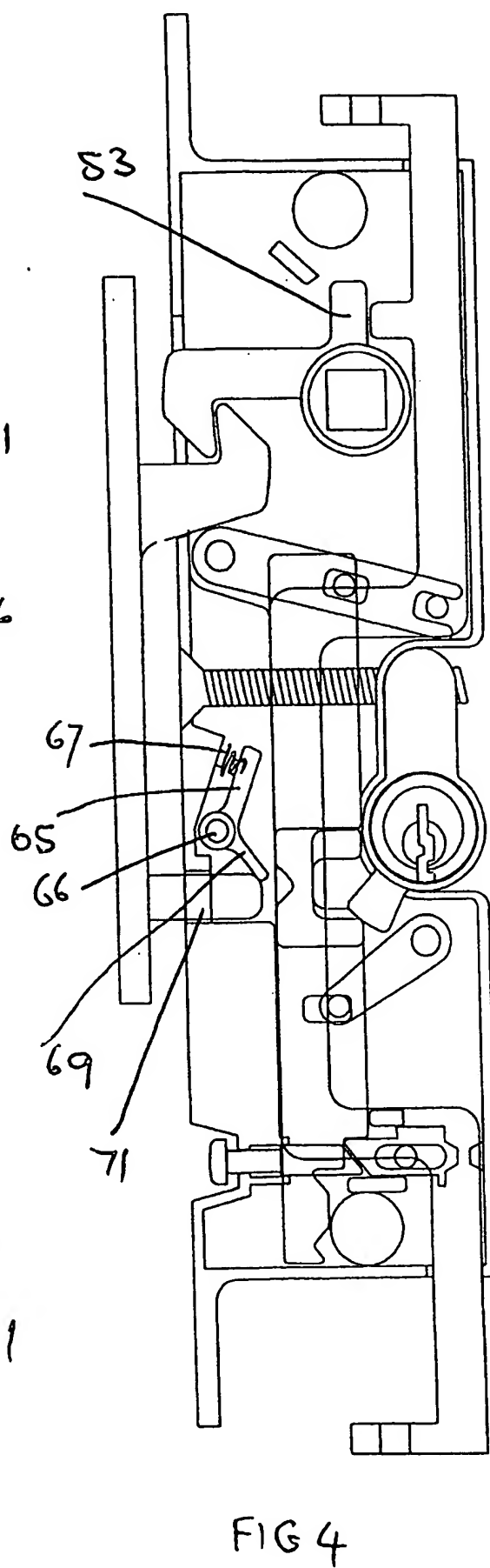
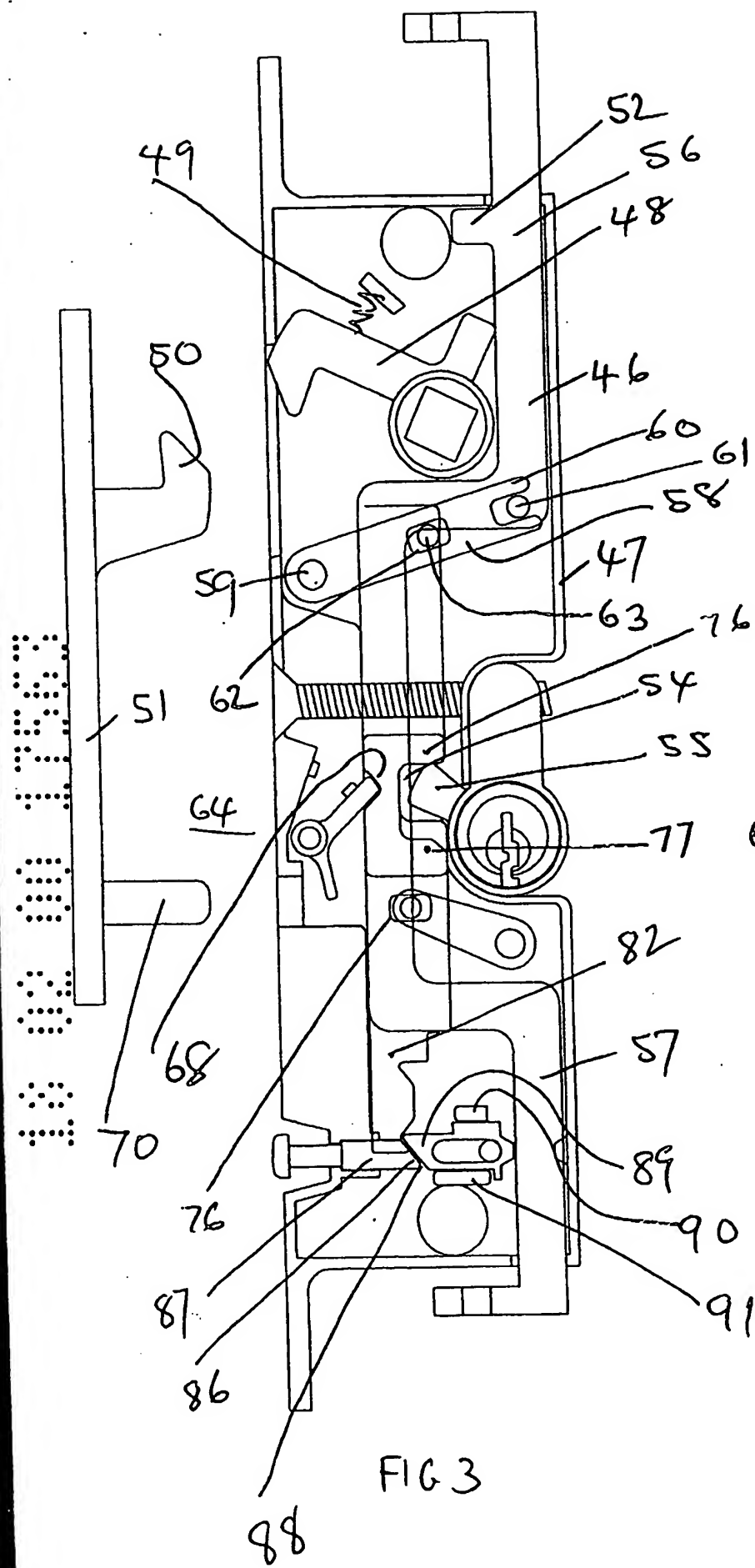


FIG 2



19 02 08 1933

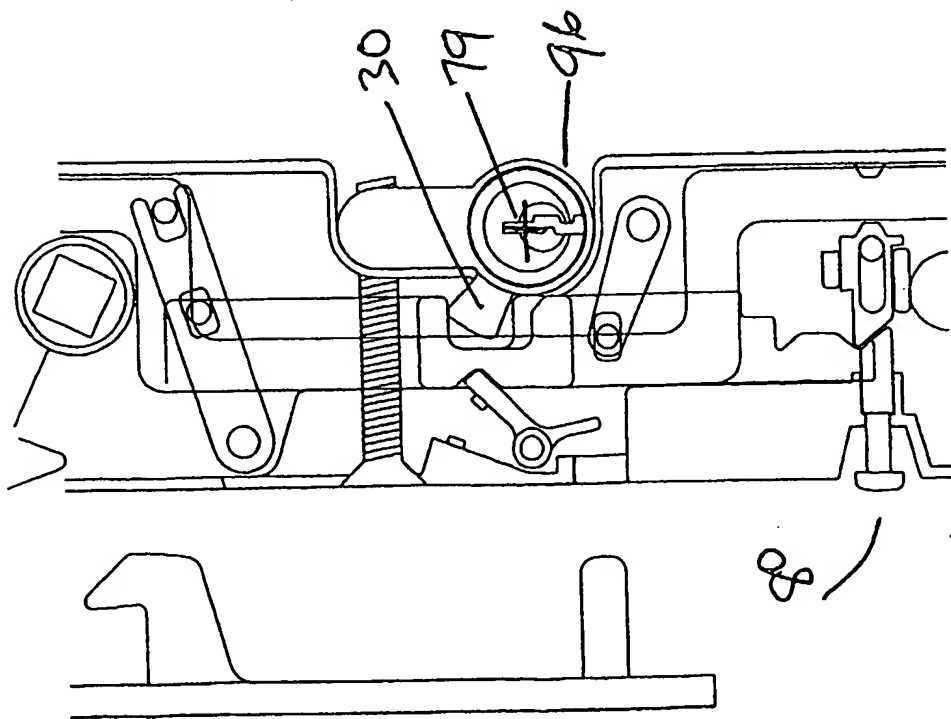


FIG 5

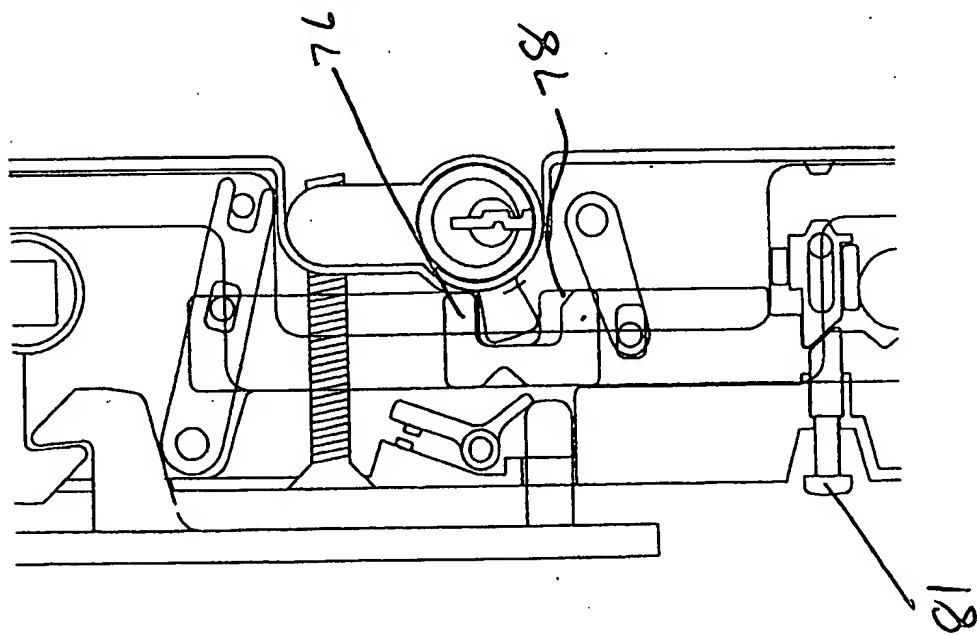


FIG 6

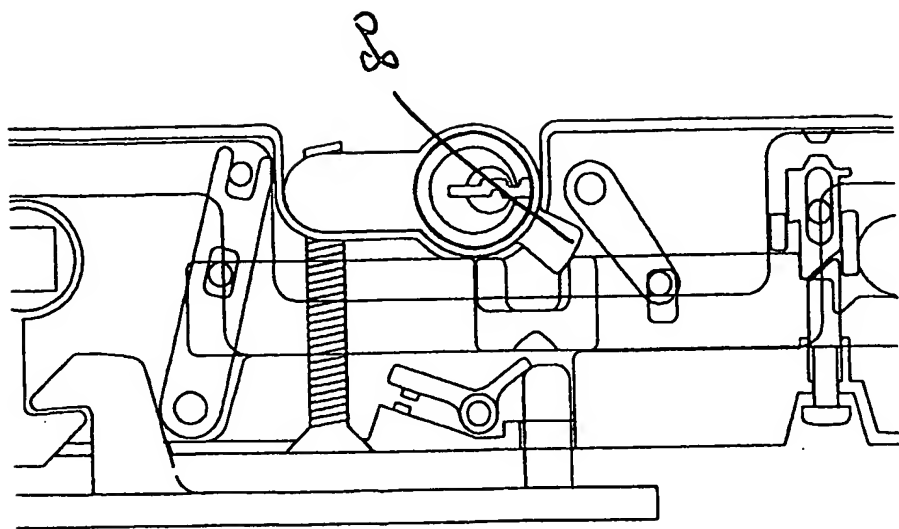


FIG 7

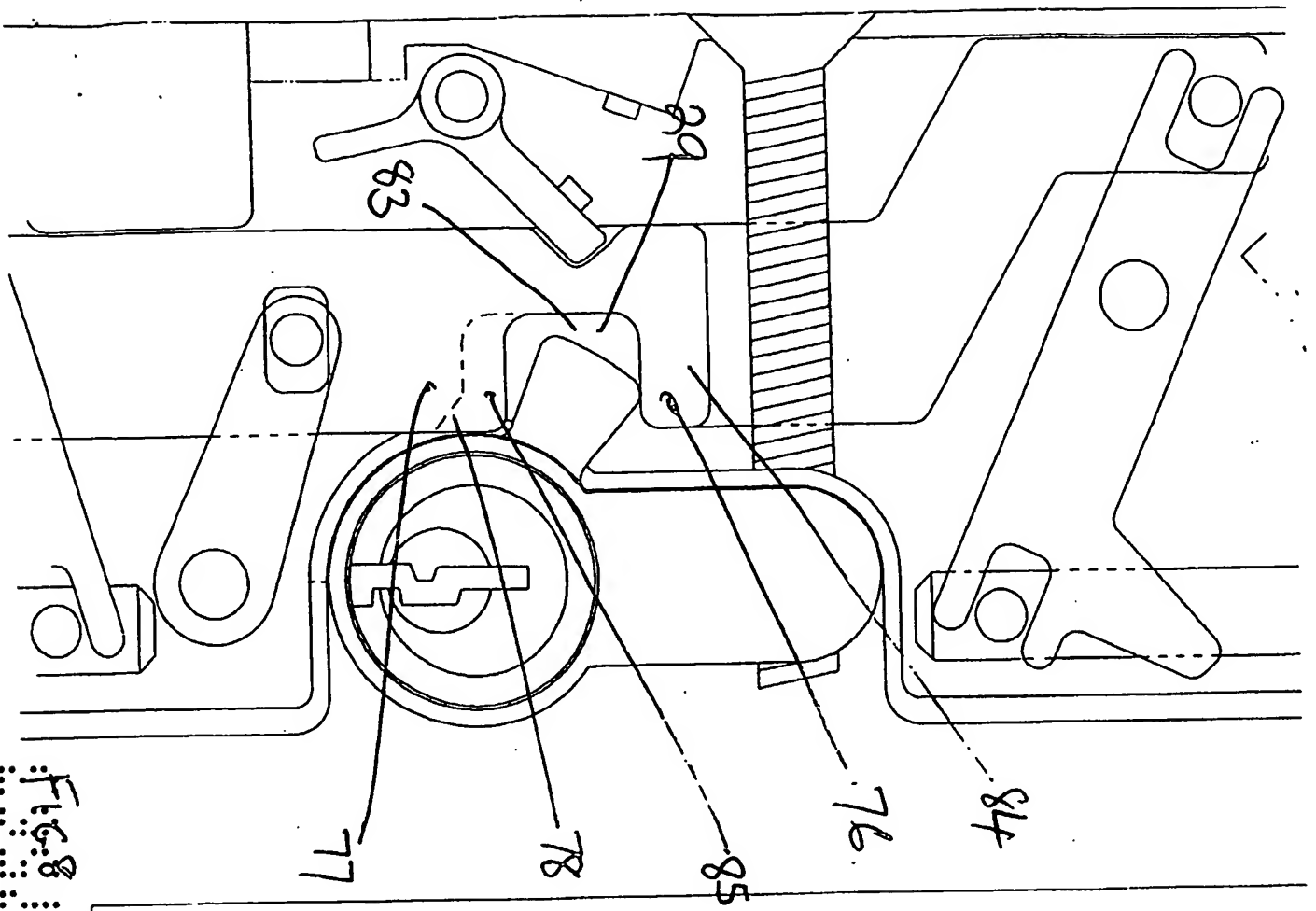


Fig. 8

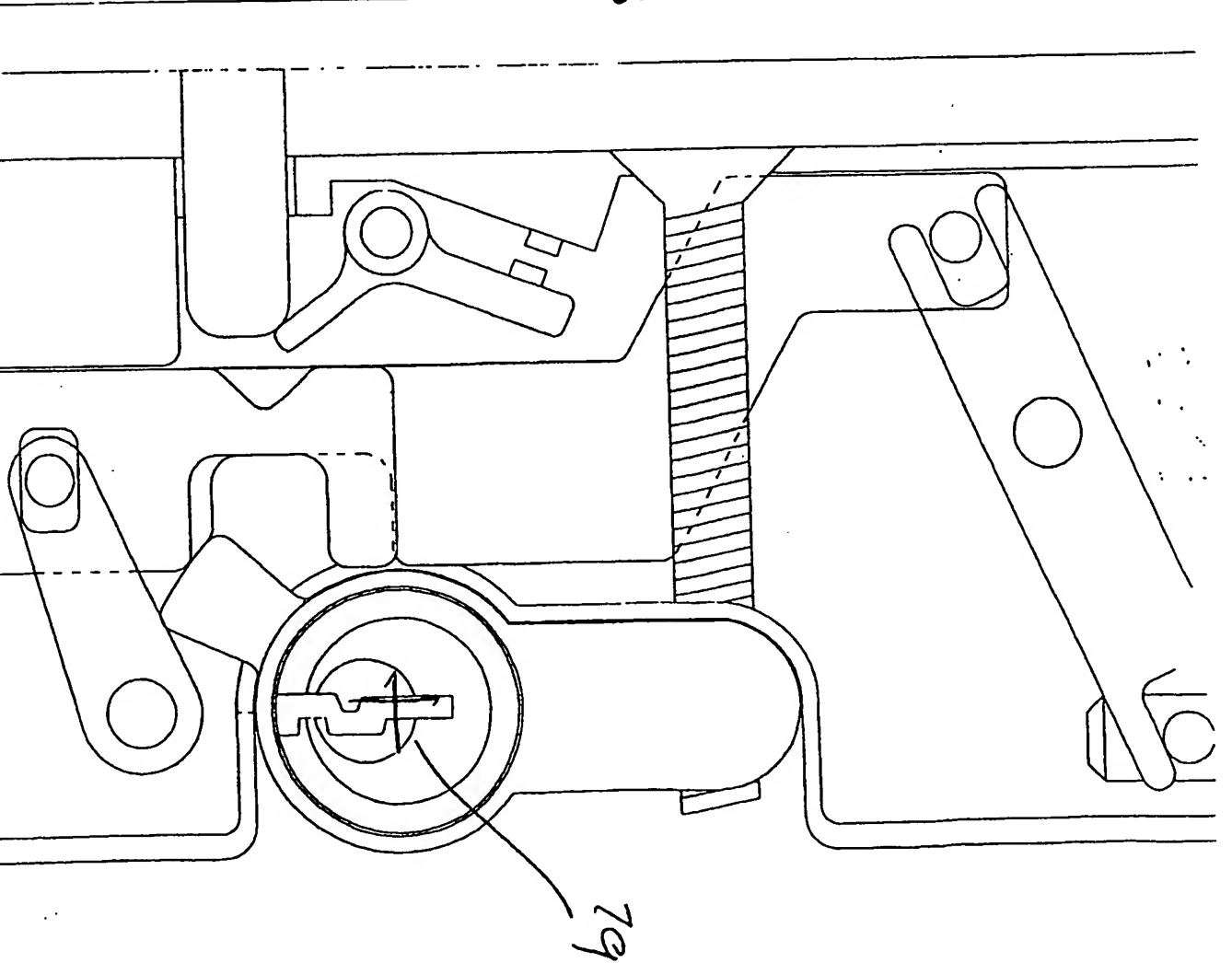
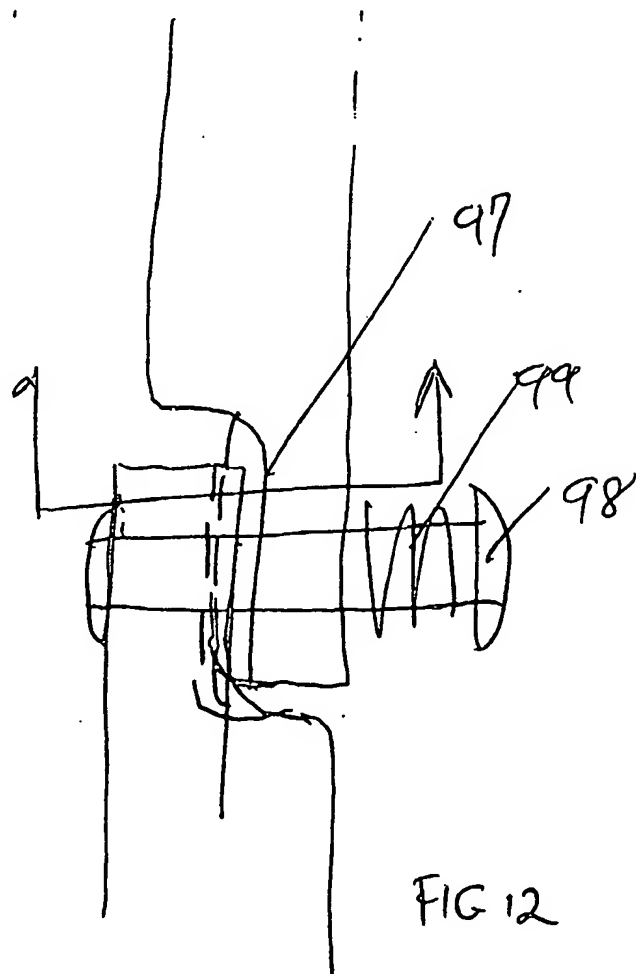
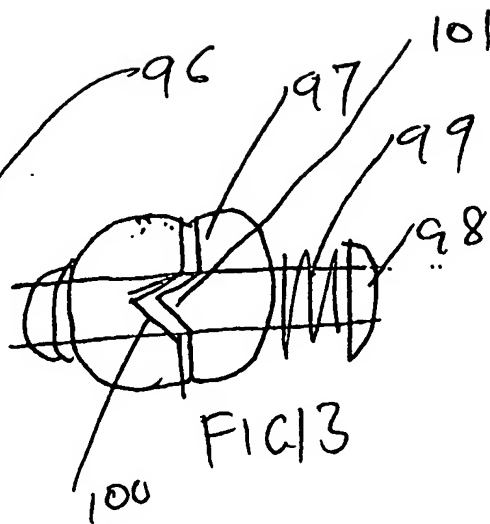
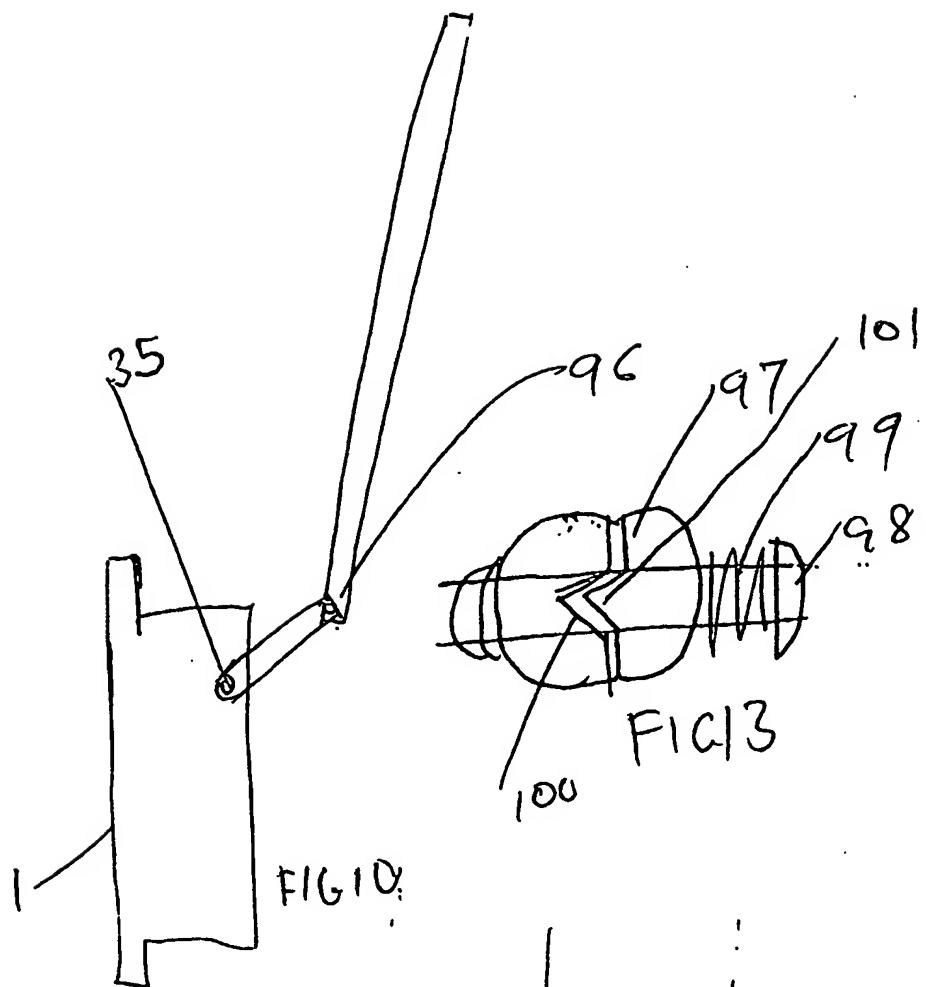


Fig. 9



Fiona Ferguson

From: Jason Jowitt [jason@l-p.com.au]
Sent: Sunday, May 22, 2005 10:32 PM
To: Fiona Ferguson
Subject: Re: New National Phase Application based on PCT/AU03/01596; Our ref 11893US; Your ref 1849023US1ANP

Dear Fiona,

Please find attached a copy of Australian patent AU 17563/001 A1 (WATTS) as requested.

Yours Sincerely
Jason Jowitt

----- Original Message -----

Subject:[Fwd: New National Phase Application based on PCT/AU03/01596; Your ref 11893US; Our ref 1849023US1ANP]
Date:Sat, 21 May 2005 11:05:35 +0930
From:Drazen Lesicar <drazen@l-p.com.au>
To:Kris <kristina@l-p.com.au>, Danielle Fryer <danielle@l-p.com.au>

----- Original Message -----

Subject:New National Phase Application based on PCT/AU03/01596; Your ref 11893US; Our ref 1849023US1ANP
Date:Fri, 20 May 2005 11:01:45 -0400
From:Fiona Ferguson <fionaf@sandandsebolt.com>
To:'Drazen Lesicar' <drazen@l-p.com.au>

Dear Drazen,

We received your instructions to file the National Phase application for the DUAL LOCK APPARATUS and will do so by the due date of 29 MAY 2005.

You mentioned in your fax that you were emailing the published PCT pamphlet. We did not receive this email, but have obtained a copy of the published application online. We have also downloaded copies of two of the references located in the International Search, but cannot obtain more than an abstract of Australian patent AU 17563/001 A1 (WATTS). Please can you fax a copy of this document to us.

We will fax you a Declaration and Power of Attorney for your client to sign. If we have not received the executed document by Thursday, May 26, 2005, we will go ahead and file the national phase application and will submit the Declaration when it is received.

If you have any questions, please do not hesitate to contact us.

5/23/2005

Yours truly,

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